

Appl. No. 10 806,514  
Amdt. dated 10/10/06  
Reply to Office action of 7/11/06

REMARKS/ARGUMENTS

Reconsideration of the application is requested.

Claims 1, 2 and 4-18 remain in the application. Claims 1, 2 and 4-8 are subject to examination and claims 9-18 have been withdrawn from examination. Claims 1 and 9 have been amended. No claims have been added or canceled.

In this regard, it is noted that MPEP 821.04 requires rejoinder of the withdrawn process claims upon allowance of product claim 1. For this reason, claim 9 has been amended to add the same limitation added to claim 1 herein.

In "Claim Rejections - 35 USC § 102/103", item 4 on pages 3-5 of the above-identified Office Action, claims 1, 4 and 5 have been rejected as being fully anticipated by or obvious over UK Patent No. 1 548 046 to Nippon Carbon Co., LTD (hereinafter Nippon) under 35 U.S.C. § 102(b) or 103(a). In this regard it is noted that Chuoku is a part of the city of Tokyo, Japan.

In "Claim Rejections - 35 USC § 102/103", item 5 on pages 5-7 of the Office Action, claims 1, 4, 7 and 8 have been rejected as being fully anticipated by or obvious over U.S. Patent No.

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5,205,888 to Mochida et al. (hereinafter Mochida) under 35 U.S.C. § 102(b) or 103(a).

In "Claim Rejections - 35 USC § 102/103", item 6 on pages 7-8 of the Office Action, claims 2 and 6 have been rejected as being obvious over Nippon or Chuoko in view of Chapter 8, Table 8.6, Page 191 of the Handbook of Carbon, Graphite, Diamond and Fullerenes ~ Properties, Processing and Applications by Pierson (hereinafter Pierson), under 35 U.S.C. § 103(a).

In "Claim Rejections - 35 USC § 102/103", item 7 on pages 8-9 of the Office Action, claim 8 has been rejected as being obvious over Nippon or Chuoko in view of U.S. Patent No. 5,413,738 to Lewis et al. (hereinafter Lewis) under 35 U.S.C. § 103(a).

The rejections have been noted and the claims have been amended in an effort to even more clearly define the invention of the instant application.

More specifically, in the paragraph bridging pages 2 and 3 of the Office Action, the Examiner has recited the conditions under which recitations in a preamble of a claim should be given patentable weight. It is believed that the claims of

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the instant application meet these conditions and that the phrase "for carbon material electrodes" should be given patentable weight.

Nevertheless, in order to facilitate prosecution of the instant application, in every instance where claims 1 and 9 mention "a connecting piece body", the claims have been amended to call for "a carbon material electrode connecting piece body." This feature should now unquestionably be given patentable weight. Support for the change is found in the original claims and Specification of the instant application.

Before discussing the prior art in detail, it is believed that a brief review of the invention as claimed, would be helpful. Claim 1 calls for, *inter alia*, a connecting piece for carbon material electrodes, comprising:

a carbon material electrode connecting piece body,

carbon fibers in said carbon material electrode connecting piece body, said carbon fibers having oxidatively activated surfaces, and

a coating added to said carbon fibers, said coating being carbonized as a carbonization product of a coating material selected from the group consisting of wax, pitch, natural resins, thermoplastic polymers, and thermosetting polymers,

said carbon material electrode connecting piece body having a linear coefficient of thermal expansion of from -0.5 to +0.1  $\mu\text{m}/(\text{K}\cdot\text{m})$  in a direction parallel to a lateral surface thereof, and from 1.7 to 2.1  $\mu\text{m}/(\text{K}\cdot\text{m})$  in a normal plane orthogonal thereto.

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Regarding the rejection of claims 1, 4 and 5 as being fully anticipated by or obvious over Nippon (or Chuoko), it is noted that the reference achieves at most a CTE (coefficient of thermal expansion) of  $0.9 \times 10^{-6}/K$  (see page 6, table 3 and example 5 of Nippon or Chuoko) by mixing non-fusible fibers into carbonaceous materials and pitch, shaping the mixture and carrying out a baking process in which the non-fusible fibers simultaneously occur with the carbonization of the carbonaceous material and the binder. Applicants agree with the Examiner on this point. However, Applicants clearly disagree with the Examiner's statement that Nippon or Chuoko teaches the product claimed in the instant application, because the electrode connecting pieces of the invention of the instant application reach CTE values in the range of -0.5 to  $+0.1 \times 10^{-6} /K$ . This huge difference (more than 900 per cent) results from the different starting materials.

As is well known from the literature, non-fusible fibers show a significant mass loss during the carbonization process (in the range of 40 to 50 per cent by weight). Therefore, it is Applicants' opinion that the product disclosed by Nippon or Chuoko is not comparable to the product claimed in the instant application.

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Furthermore, the Examiner compares the CTE of carbon fibers with the CTE of the claimed product. Applicants could agree with the Examiner that a CTE of from -0.5 to +0.1  $\mu\text{m}/(\text{Km})$  in a direction parallel to a lateral surface of carbon fibers and from 1.7 to 2.1  $\mu\text{m}/(\text{Km})$  in a normal plane orthogonal thereto is known. However, what is new and not anticipated by or obvious over the prior art is that carbon material electrode connecting piece bodies have this CTE value.

Therefore, Applicants cannot agree with the Examiner's opinion that the claimed coefficient of thermal expansion would have obviously been present once the carbon electrode of Nippon or Chuoko was provided.

Regarding the rejection of claims 1, 4, 7 and 8 as being fully anticipated by or obvious over Mochida, Applicants agree with the Examiner that Mochida describes a process for making carbon fiber reinforced materials. Applicants further agree that Mochida teaches that the carbon fibers being used should preferably be subjected to a preliminary surface treatment such as oxidation. The differences between the claimed subject matter and the subject matter disclosed by Mochida are as follows:

- a) a carbonized coating added to the carbon fibers having

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oxidatively activated surfaces; and

----- b) the omission of the above-described preliminary heat treatment of about 600°C in an inert gas atmosphere for two hours (see Mochida, claims 1, 2, 5 or 6 and column 4, lines 5 to 15, 21 to 30 and 36 to 47).

Applicants could agree with the Examiner that the values described for the flexural strength or bending strength are not directly comparable, but this is due to the fact that the methods used do not exactly define the size of the samples (see ASTM C651 or ISO 12986-2). The size of the samples being produced does not matter. Therefore, it could not be proven from the published values of the flexural strength that the different production methods led to different products, although this is expected to be the case and data of comparative examples could be provided if necessary.

Regarding the rejection of claim 8 as being obvious over Nippon in view of Lewis, it is noted that Lewis describes carbon-carbon composites and their application as graphite electrodes. Lewis states that "a low coefficient of thermal expansion is extremely important in carbon-carbon composites, especially graphite electrodes" (see column 4, lines 50 to 52). Lewis teaches the use of a carbonaceous pitch

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containing polymerized and cross-linked aromatic components thereof and a coke filler for the production of graphite electrodes (see claim 1 of Lewis). The mixture could also contain carbonaceous reinforcing materials including carbon or graphite fibers (see column 12, lines 58 to 63 and example 11 of Lewis).

The invention recited in the claims of the instant application differs from that of Lewis by adding carbonized coated carbon fibers having oxidatively activated surfaces. This difference led to the reduction of the CTE value by at least 50 per cent (CTE values in the range of -0.5 to  $+0.1 \times 10^{-6}/K$  for the claimed invention as compared to CTE values of as much as about  $0.2 \times 10^{-6} /^{\circ}\text{C}$  in Lewis (see column 14, lines 66 to 68 of Lewis). This is proved by the examples disclosed by Lewis.

Regarding the rejection of claims 2 and 6 as being obvious over Nippon or Chuoko in view of the Pierson handbook, Pierson does not make up for the deficiencies of the other references.

Not only are the limitations of the product claims in the instant application not found in the prior art, but it has been found that the graphite electrode connecting pieces

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according to the invention excel over the prior art  
electrodes.

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Clearly, neither Nippon (or Chuoko), nor Mochida, nor Lewis, nor Pierson show a carbon material electrode connecting piece body having a linear coefficient of thermal expansion of from -0.5 to +0.1  $\mu\text{m}/(\text{K}\cdot\text{m})$  in a direction parallel to a lateral surface thereof, and from 1.7 to 2.1  $\mu\text{m}/(\text{K}\cdot\text{m})$  in a normal plane orthogonal thereto, as recited in claim 1 of the instant application.

It is accordingly believed to be clear that none of the references, whether taken alone or in any combination, either show or suggest the features of claim 1. Claim 1 is, therefore, believed to be patentable over the art. The dependent claims are believed to be patentable as well because they all are ultimately dependent on claim 1.

In view of the foregoing, reconsideration and allowance of claims 1, 2 and 4-8 as well as rejoinder and allowance of claims 9-18, are solicited.

In the event the Examiner should still find any of the claims to be unpatentable, counsel would appreciate receiving a

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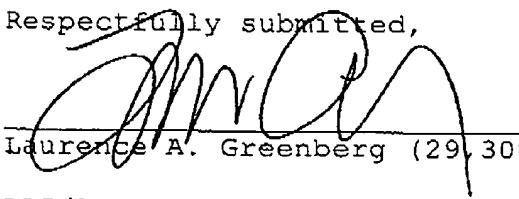
telephone call so that, if possible, patentable language can be worked out.

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If an extension of time is required, petition for extension is herewith made. Any extension fee associated therewith should be charged to Deposit Account Number 12-1099 of Lerner Greenberg Stemer LLP.

Please charge any other fees that might be due with respect to Sections 1.16 and 1.17 to Deposit Account Number 12-1099 of Lerner Greenberg Stemer LLP.

Respectfully submitted,



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